Hall Ticket Number

Q.B. No. 100313

Booklet Code : A

Marks : 100

DL-325-COMP

Time : 120 Minutes

Paper-II

Signature of the Candidate

Signature of the Invigilator

INSTRUCTIONS TO THE CANDIDATE
(Read the Instructions carefully before Answering)

1. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you along with Question Paper Booklet. Please read and follow the instructions on the OMR Answer Sheet for marking the responses and the required data.
2. The candidate should ensure that the **Booklet Code printed on OMR Answer Sheet and Booklet Code supplied are same.**
3. **Immediately on opening the Question Paper Booklet by tearing off the paper seal, please check for (*i*) The same booklet code (A/B/C/D) on each page. (*ii*) Serial Number of the questions (1-100), (*iii*) The number of pages and (*iv*) Correct Printing.** In case of any defect, please report to the invigilator and ask for replacement of booklet with same code within five minutes from the commencement of the test.
4. Electronic gadgets like Cell Phone, Calculator, Watches and Mathematical/Log Tables are not permitted into the examination hall.
5. **There will be 1/4 negative mark for every wrong answer.** However, if the response to the question is left blank without answering, there will be no penalty of negative mark for that question.
6. Record your answer on the OMR answer sheet by using Blue/Black ball point pen to darken the appropriate circles of (1), (2), (3) or (4) corresponding to the concerned question number in the OMR answer sheet. Darkening of more than one circle against any question automatically gets invalidated and will be treated as wrong answer.
7. Change of an answer is **NOT** allowed.
8. Rough work should be done only in the space provided in the Question Paper Booklet.
9. **Return the OMR Answer Sheet and Question Paper Booklet to the invigilator before leaving the examination hall.** Failure to return the OMR sheet and Question Paper Booklet is liable for criminal action.

This Booklet consists of **17** Pages for **100** Questions +**2** page of Rough Work +1 Title Page i.e. Total **20** pages

1. Which of the following algorithms is used to find a minimum spanning tree in a graph ?
   (1) Dijkstra's algorithm (2) Prim's algorithm
   (3) Floyd-Warshall Algorithm (4) Huffman's algorithm
2. The Quick Sort algorithm performs with best case time complexity on a list having elements in descending order if the pivot is chosen as :
   (1) first element (2) middle element
   (3) last element (4) any element
3. What is the time complexity in θ notation for finding the smallest element in a list of n elements using bubble sort algorithm ?
   (1) $0(\log n)$ (2) $0(n)$
   (3) $0(n^2)$ (4) $0(1)$
4. It is NOT possible to find the largest element in the first pass of the following sorting algorithm.
   (1) Bubble Sort (2) Selection Sort
   (3) Insertion Sort (4) Heap Sort
5. We can apply Dynamic programming strategy only if the following property is satisfied by the problem :
   (1) Greedy property (2) Optimality Principle
   (3) Memorization (4) Overlapping subproblems
6. Dijkstra's algorithm is based on which strategy ?
   (1) Greedy (2) Divide and Conquer
   (3) Dynamic Programming (4) Backtracking
7. The search strategy followed by a branch and bound algorithm is generally :
   (1) Breadth First Search (BFS) (2) Depth First Search (DFS)
   (3) A combination of BFS and DFS (4) Random Search
8. How many times does the word "hello" get printed when the function (pseudocode) Hello(5) is called ?

```
Hello(n)
{
sum = 1;
while (sum < n) { for i = 1 to n {printf("hello")}
sum = sum*2; }
}
```

   (1) 5 (2) 10
   (3) 15 (4) 20
9. Let T be a tree with 10 vertices. What is the sum of the degrees of all the vertices in the tree T ?
   (1) 10 (2) 18
   (3) 20 (4) Cannot say

10. A computer's memory is composed of 8K words of 32 bits each, and the smallest addressable memory unit is a byte. How many bits will be required for the memory address ?
(1) 12 (2) 15
(3) 13 (4) 10

11. In a 8086/8088 Microprocessor, the unit responsible for getting the instructions from memory and loading in the Queue is :
(1) Execution Unit (2) Registers
(3) Stack (4) Bus Interface Unit

12. Interrupts can be generated in response to :
(1) detected program errors such as arithmetic overflow or division by zero
(2) detected hardware faults
(3) both (1) and (2)
(4) either (1) or (2)

13. Refer the following code snippet.

```
sum=1;  count=0; result=10;
if sum==0)
        if(count==0)
                result=0;
else
        result=1;
```

Normally, 'else' is paired with recent previous unpaired 'if'. What will be value of variable 'result' after executing the code snippet :
(1) 1 (2) 0
(3) 5 (4) 10

14. Some programming languages like PERL and Common LISP allow variables to be declared to have dynamic scope. This dynamic scoping is based on which of the following ?
(1) Spatial relationship of the subprograms
(2) Calling sequence of the subprograms
(3) Both spatial and calling sequence of the subprograms
(4) Can be determined before run time

15. While handling concurrency both monitor and semaphore constructs are used. Which of the choices is NOT True ?
(1) Semaphore can be used to implement monitor and monitor can be used to implement Semaphore
(2) Monitors are better way to provide competition synchronization compared to semaphore
(3) Monitors are better way to provide cooperative synchronization than semaphore
(4) Semaphore and monitor both are equally good for competition and co-operative synchronization

16. In 8086 microprocessor which of the following has the highest priority among all type interrupts ?

(1) NMI (2) DIV 0

(3) TYPE 255 (4) OVER FLOW

17. The following are some events that occur after a device controller issues an interrupt while process L is under execution.

(*a*) The processor pushes the process status of L onto the control stack.

(*b*) The processor finishes the execution of the current instruction.

(*c*) The processor executes the interrupt service routine.

(*d*) The processor pops the process status of L from the control stack.

(*e*) The processor loads the new PC value based on the interrupt.

Which one of the following is the *correct* order in which the events above occur ?

(1) baecd (2) aecdb

(3) ecabd (4) beacd

18. Given $f(w, x, y, z) =$

$$\sum_{m}(0, 1, 2, 3, 7, 8, 10) + \sum_{d}(5, 6, 11, 15)$$

Where d represents the don't-care condition in Karnaugh maps. Which of the following is a minimum product-of-sum (POS) form of $f(w, x, y, z)$?

(1) $f = (\overline{w} + z)(\overline{x} + z)$ (2) $f = (\overline{w} + z)(x + z)$

(3) $f = (w + z)(\overline{x} + z)$ (4) $f = (w + \overline{z})(\overline{x} + z)$

19. A logic circuit has three input bits : X_0, X_1, and X_2, where X_0 is the least significant bit and X_2 is the most significant bit. The output from the circuit is 1 when its input is any of the 3-bit numbers 1, 4, 5, or 6; otherwise, the output is 0. Which of the following expressions represents the output from this circuit ? [Note: X' implies X compliment]

(1) $X'_2 + X'_1 + X'_0$ (2) $X'_2X_0 + X_2X'_1$

(3) $X'_1X_0 + X_2X'_0$ (4) $X'_2X_1X_0 + X_2X'_1$

20. Let the page fault service time be 10 ms in a computer with average memory access time being 20 ns. If one page fault is generated for every 10^6 memory accesses, what is the closest effective access time for the memory ?

(1) 21 ns (2) 30 ns

(3) 23 ns (4) 35 ns

21. Consider the methods used by processes P1 and P2 for accessing their critical sections whenever needed, as given below. The initial values of shared Boolean variables S1 and S2 are randomly assigned :

Method Used by P1	Method Used by P2
While (S1==S2); *Critical Section* *S1=S2*	*While (S1 !=S2);* *Critical Section* *S2= !(S1)*

Which one of the following statements describes the properties achieved ?

(1) Mutual exclusion but not progress

(2) Progress but not mutual exclusion

(3) Neither mutual exclusion nor progress

(4) Both mutual exclusion and progress

22. Consider a disk system with 100 cylinders. The requests to access the cylinders occur in the following sequence :

4, 34, 10, 7, 19, 73, 2, 15, 6, 20

Assuming that the head is currently at cylinder 50, what is the time taken to satisfy all requests if it takes 2 ms to move from one cylinder to adjacent one and 'shortest seek time first' policy is used ?

(1) 190 ms (2) 188 ms

(3) 466 ms (4) 552 ms

23. A process executes the following code

for (i=0; i<n; i++) fork;

The total number of child processes created is :

(1) n (2) $2^n - 1$

(3) 2^n (4) $2^{(n+1)} - 1$;

24. A system shares 9 tape drives. The current allocation and maximum requirement of tape drives for 3 processes are shown below :

Process	Current Allocation	Maximum Requirement
P1	3	7
P2	1	6
P3	3	5

Which of the following best describes current state of the system ?

(1) Safe, Deadlocked (2) Not Safe, Deadlocked

(3) Safe, Not Deadlocked (4) Not Safe, Not Deadlocked

25. Consider the following C code. Assume that unsigned long int type length is 64 bits.

```
Unsigned long int fun(unsigned long int n)
{
        unsigned long int i, j = 0, sum = 0;
        for (i = n; i > 1; i = i/2)
                j++;
        for ( ; j > 1; j = j/2)
                sum++;
        return(sum);
}
```

The value returned when we call fun with the input 2^{40} is :

(1) 4 (2) 5

(3) 6 (4) 40

26. Consider the following C program :

```
#include<stdio.h>
void fun1(char *s1, char *s2)
{
        char *tmp;
        tmp = s1;
        s1 = s2;
        s2 = tmp;
}
void fun2(char **s1, char **s2)
{
        char *tmp;
        tmp = *s1;
        *s1 = *s2;
        *s2 = tmp;
}
int main()
{
        char *str1 = "Hi", *str2 = "Bye";
        fun1(str1, str2); printf("%s %s ", str1, str2);
        fun2(&str1, &str2); printf("%s %s", str1, str2);
        return 0;
}
```

The output of the program above is :

(1) Hi Bye Bye Hi (2) Hi Bye Hi Bye

(3) Bye Hi Hi Bye (4) Bye Hi Bye Hi

27. For the IEEE 802.11 MAC protocol for wireless communication, which of the following statements is/are TRUE ?

(*a*) At least three non-overlapping channels are available for transmissions.

(*b*) The RTS-CTS mechanism is used for collision detection.

(*c*) Unicast frames are ACKed.

(1) All (*a*), (*b*) and (*c*) (2) (*a*) and (*c*) only

(3) (*b*) and (*c*) only (4) (*b*) only

28. Which one of the following fields of an IP header is NOT modified by a typical IP router ?

(1) Checksum (2) Source address

(3) Time to Live (TTL) (4) Length

29. Find the best possible match in the following table :

Field	**Length in bits**
(*a*) UDP Header's Port Number	(*i*) 48
(*b*) Ethernet MAC Address	(*ii*) 8
(*c*) IPv6 Next Header	(*iii*) 32
(*d*) TCP Header's Sequence Number	(*iv*) 16

(1) (*a-iii*), (*b-iv*), (*c-ii*), (*d-i*) (2) (*a-ii*), (*b-i*), (*c-iv*), (*d-iii*)

(3) (*a-iv*), (*b-i*), (*c-ii*), (*d-iii*) (4) (*a-iv*), (*b-i*), (*c-iii*), (*d-ii*)

30. In one of the pairs of protocols given below, both the protocols can use multiple TCP connections between the same client and the server. Which one is that ?

(1) HTTP, FTP (2) HTTP, TELNET

(3) FTP, SMTP (4) HTTP, SMTP

31. Consider the recurrence function :

$$T(n) = \begin{cases} 2T(\sqrt{n}) + 1, & n > 2 \\ 2, & 0 < n \leq 2 \end{cases}$$

Then $T(n)$ in terms of average case (Θ notation) is :

(1) $\Theta(\log \log n)$ (2) $\Theta(\log n)$

(3) $\Theta(\sqrt{n})$ (4) $\Theta(n)$

32. Suppose that a certain software product has a mean time between failures of 10,000 hours and has a mean time to repair of 20 hours. If the product is used by 100 customers, what is its availability ?

(1) 100% (2) 99.8%

(3) 98% (4) 90%

33. Assume that the algorithms considered here sort the input sequences in ascending order. If the input is already in ascending order, which of the following are True ?

(a) Quick sort runs in $O(n^2)$ time
(b) Bubble sort runs in $O(n^2)$ time
(c) Merge sort runs in $O(n)$ time
(d) Insertion sort runs in $O(n)$ time

(1) (a) and (b) only (2) (a) and (c) only
(3) (b) and (d) only (4) (a) and (d) only

34. The hit ratio of a cache memory is the percentage of access (reads and writes) for which data are found in the cache. Write-through, Write-back are two main policies for memory updation. Write allocation is a policy whereby a cache line is allocated and loaded on a write miss. If it is assumed that write-allocation is always used, which of the following is true.

(1) Write-back usually results in a better hit ratio than write-through.
(2) Write through usually results in a better hit ratio than write-back
(3) The percentage of write operations resulting in a main memory operation will never be larger for write back than for write-through
(4) Write through can only be employed in set-associative memory

35. For computers based on three-address instruction formats, each address field can be used to specify which of the following :

(S1) A memory operand
(S2) A processor register
(S3) An implied accumulator register

(1) Either S1 or S2 (2) Either S2 or S3
(3) Only S2 and S3 (4) Only S3

36. Identify the correct order in which a server process must invoke the function calls accept, bind, listen, and recv according to UNIX socket API.

(1) listen, accept, bind, recv (2) bind, listen, accept, recv
(3) bind, accept, listen, recv (4) accept, listen, bind, recv

37. The time complexity required by the best algorithm to search an element 'x' within a sorted singly linked list is :

(1) O(logn) (2) O(nlogn)
(3) $O(n)$ (4) O(1)

38. Identify the data structure whose insertion, search and deletion time complexities are O(1), $O(n)$ and O(1) respectively :

(1) Array (2) Hash Table
(3) Queue (4) Stack

39. A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called as :

(1) Lemma tree (2) Redblack tree
(3) AVL tree (4) B-Tree

40. A sender sends packets to a receiver using the Stop and Wait protocol. If the distance between them is decreased, the efficiency :
(1) Increases (2) Decreases
(3) Remains same (4) Cannot say

41. Given a relational schema R(A,B,C,D,E) with functional dependencies {A→D, C→E, B →A}. If this relation is split into two relations R_1(A,B,C) and R_2(B,D,E), the new relation R_1 is now in :
(1) 1NF (2) 2NF
(3) 3NF (4) BCNF

42. In E-R diagram, the term cardinality is synonymous to the term :
(1) Attribute (2) Degree
(3) Entities (4) Cartesian

43. The number of 8-bit strings that can be formed that begins with either '111....' or '101....' is :
(1) 32 (2) 64
(3) 128 (4) 256

44. In the IPv4 addressing format, the number of networks allowed under class C addresses is :
(1) 2^{14} (2) 2^{7}
(3) 2^{21} (4) 2^{24}

45. In the clipping algorithm of Cohen and Sutherland using region codes, a line is already clipped if the :
(1) Codes of the end points are the same and logical AND of the end points code is not 0000
(2) Codes of the end points are not same and logical AND of the end points code is not 0000
(3) Codes of the end points are the same and logical AND of the end points code is 0000
(4) Codes of the end points are not same and logical AND of the end points code is 0000

46. Pixel phasing is a technique for :
(1) shading (2) anitaliasing
(3) hidden line removal (4) edge detection

47. Which of the following points lies on the same side as the origin with reference to the line $3x + 7y = 2$?
(1) (3, 0) (2) (1, 0)
(3) (0.5, 0.5) (4) (0.5, 0)

48. Reflection of a point about x-axis followed by a counter clockwise rotation of 90° is equivalent to reflection about the line :
(1) $x = -y$ (2) $y = -x$
(3) $x = y$ (4) $x + y = 1$

49. The subcategories of orthographic projection are :
(1) isometric, dimetric, trimetric
(2) cavalier, cabinet
(3) cavalier, cabinet, isometric
(4) isometric, cavalier, trimetric

50. Let R be the radius of a circle. The angle subtended by an arc of length R at the center of the circle is :
(1) 1 degree (2) 1 radian
(3) 45 degree (4) 90 degree

51. In the raster-scan method for transformation a 90° rotation can be performed by :
(1) reserving the order of bits within each row in the frame buffer
(2) by performing XOR on the frame buffer location
(3) by copying each row of the block into a column in the new frame buffer location
(4) reserving the order of bits within each column in the frame buffer

52. Assume transaction A hold a shared lock R. If transaction B also requests for a shared lock on R, it will :
(1) result in a deadlock situation
(2) immediately be granted
(3) immediately be rejected
(4) be granted as soon as it is released by A

53. The data flow model of an application mainly shows :
(1) the underlying data and relationships among them
(2) processing requirements and the flow of data
(3) decision and control information
(4) communication network structure

54. Given the functional dependencies :
$$X \to W,\ X \to Y,\ Y \to Z \text{ and } Z \to PQ$$
Which of the following does not hold good ?
(1) $X \to Z$ (2) $W \to Z$
(3) $X \to WY$ (4) $W \to PQ$

55. Which level of RAID refers to disk mirroring with block striping ?
(1) RAID level 1 (2) RAID level 2
(3) RAID level 0 (4) RAID level 3

56. Conceptual schema is transformed from high level data model into the implementation data model. This step is called as :
(1) Data model mapping (2) Conceptual schema
(3) Functional mapping (4) Conceptual operation

57. The five aggregation operators in SQL are :
(1) SUM, AVG, IN, DISTINCT, COUNT
(2) SUM, AVG, MIN, MAX, COUNT
(3) SUM, AVG, MIN, MAX, DISTINCT
(4) SUM, AVG, IN, ALL, ANY

58. Let R(A,B,C,D) be a relational scheme and :

$$F = \{ AB \rightarrow CD,\ ABC \rightarrow E,\ C \rightarrow E \}$$

be the set of functional dependencies, what is the normal form of R ?
(1) 1NF (2) 2NF
(3) 3NF (4) BCNF

59. Given a relationship R(A,B,C) and the set

$$F = \{AB \rightarrow C,\ B \rightarrow D, D \rightarrow B\}$$

of functional dependencies then the candidate key(s) of the relation is/are :
(1) AB,BD (2) AB,AD
(3) AD (4) AB

60. In RDBMS, which data structure used in the internal storage representation ?
(1) B^+ trees (2) B trees
(3) Linked list (4) Hash table

61. Indicate which of the following statements are true : A relation database which is in 2NF may still have undesirable data redundancy because there may exit :
(1) Transitive functional dependencies
(2) Non-trivial functional dependencies involving prime attributes on the right side
(3) Non-trivial functional dependencies involving prime attributed only on the left side
(4) Non-trivial functional dependencies involving only prime attributes

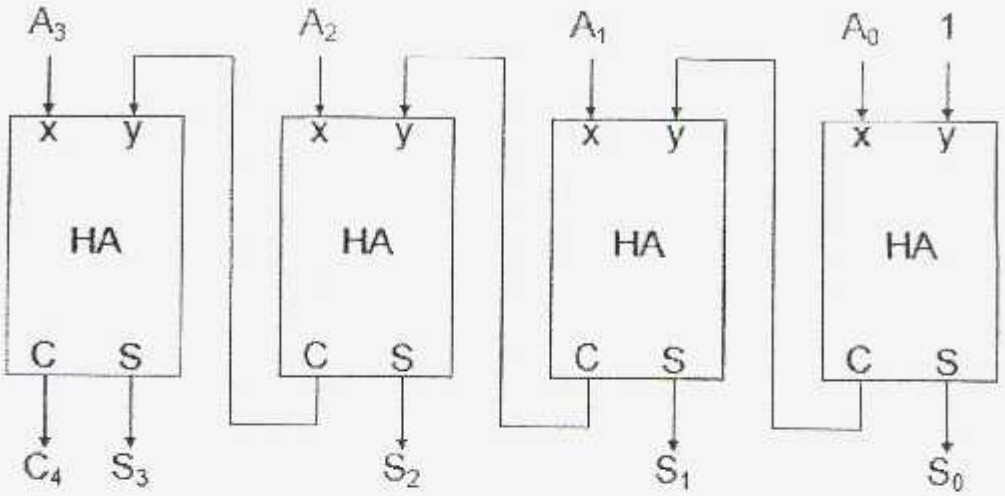
62. Ethernet system used which of the following topology ?
(1) Tree (2) Ring
(3) Star (4) Bus

63. In OSI layer, which layer performs management of tokens ?
(1) Network layer (2) Transport layer
(3) Session layer (4) Application layer

64. Which type of protocol provides a virtual terminal in TCP/IP model ?
(1) SMTP (2) Telnet
(3) HTTP (4) FTP

65. Communication via circuit switching involves three phases, which are :
(1) Circuit establishment, data transfer, circuit disconnect
(2) Circuit establishment, data compression, circuit disconnect
(3) data transfer, data compression, circuit disconnect
(4) Circuit establishment, data compression, data transfer

66. HA denotes Half Adder, C denotes Carry, S denotes Sum, A_0, A_1, A_2, A_3 are the bits of a 4-bit number with A_0 as the Least Significant Bit and A_3 is the Most Significant Bit. The following block diagram represents a :



(1) 4-bit adder (2) 4-bit substractor
(3) 4-bit complement (4) 4-bit incrementer

67. The sequence of events that happen during a fetch operation is :
(1) PC → MAR → MEMORY → MDR → IR
(2) PC → MEMORY → IR
(3) PC → MEMORY → MDR → IR
(4) PC → MAR → MEMORY → IR

68. Given a set of production rules :

$$S \rightarrow aA \mid *S \quad A \rightarrow +S \mid (S \mid \varepsilon$$

Set { +, (} will be in the
(1) First (A) (2) First (E)
(3) Follow (E) (4) Follow (A)

69. S → aSAb | bSBc
A → +AB | ε
B → *BC | ε
C → aC | d
What is in the Follow(S) ?
(1) {a, b, c, +, $} (2) {a, c, +, *, $}
(3) {b, c, +, *, $} (4) {a, b, d, *, $}

70. If G is a grammar with productions :

$$S \rightarrow SaS \mid aSb \mid bSa \mid SS \mid \varepsilon$$

where S is the start variable, then which one of the following strings is not generated by G ?
(1) abab (2) aaab
(3) abbaa (4) babba

71. Consider the following two statements :

(*a*) If all states of an NFA are accepting states then the language accepted by the NFA is Σ^*.

(*b*) There exists a regular language A such that for all languages B, A ∩ B is regular.

Which one of the following is correct ?

(1) (*a*) only (2) (*b*) only

(3) both (*a*) and (*b*) (4) neither (*a*) nor (*b*)

72. Which one of the following phases can be eliminated in Agile driven development ?

(1) Requirements elicitation

(2) Requirements specification

(3) Design

(4) Testing

73. The relationship of data elements in a module is called :

(1) Coupling (2) Modularity

(3) Cohesion (4) Stability

74. Testing which is performed after making changes to the existing software is known as :

(1) Regression testing (2) Integration testing

(3) System testing (4) Acceptance testing

75. The number of independent paths in a program is computed by the following metrics :

(1) Function point (2) LOC

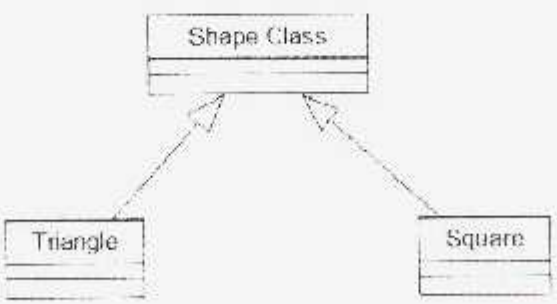
(3) Cyclomatic complexity (4) Effort

76. A collection of operations that provides a service to an entity is known as :

(1) Class (2) Object

(3) Interface (4) Use case

77. Which type of relationship is represented by Shape Class and Triangle ?



(1) Realization (2) Generalization

(3) Aggregation (4) Dependency

78. Unified Modelling Language (UML) is a tool for modelling the system. Which thing in UML contains explanatory parts of UML models ?

(1) Structural thing (2) Behavioural thing

(3) Grouping thing (4) Annotational thing

79. In C++, we can use the same function name to create functions that perform variety of different tasks. This is generally known as :

(1) Global function (2) Function overloading

(3) Inheritance (4) Generalization

80. In Object Oriented Concept, the mechanism by which data and functions are bound together with an object definition is known as :

(1) Inheritance (2) Polymorphism

(3) Abstraction (4) Encapsulation

81. ATM (Asynchronous Transfer Mode) fundamentally follows which switching technology ?

(1) Circuit Switching (2) Packet Switching

(3) Both (1) and (2) (4) It is not a switching technique

82. The time complexity of the following algorithm is :

```
M=1
X=1
for I =  1 to n do
begin
        M = M * 2
        for J = 1 to M
        X = X + 1
        endfor
endfor
```

(1) $O(n^2)$ (2) $O(M^2)$

(3) $O(2^{n+1})$ (4) $O(M^2n^2)$

83. If x is a string, then x^R denotes the reversal of x, If x and y are strings, then $(xy)^R$ =

(1) xy^R (2) yx^R

(3) y^Rx^R (4) x^Ry^R

84. The local operating system on the server machine passes the incoming packets to the :

(1) server stub (2) client stub

(3) client operating system (4) both server stub and client stub

85. In a distributed synchronization problem where there are 'n' number of processes, when a process P_i wants to enter its critical section, it generates a new timestamp, TS, and sends the message request (P_j, TS) to all processes in the system (including itself). On receiving a request message, a process may reply immediately (that is, send a reply message back to P_i), or it may defer sending a reply back (because it is already in its critical section, for example). A process that has received a reply message from all other processes in the system can enter its critical section, queuing incoming requests and deferring them. After exiting its critical section, the process sends reply messages to all its deferred requests.
When processes act independently and concurrently, the number of messages per critical-section entry is :

(1) $n - 1$ (2) $2*(n - 1)$

(3) $n^2 - 1$ (4) n^3

86. What are the advantages of token (with rings) passing approach ?

(*i*) One processor as coordinator which handles all request

(*ii*) No starvation if the ring is unidirectional

(*iii*) There are many messages passed per section entered if few users want to get in section

(*iv*) Only one message/entry if everyone wants to get in

(1) (*i*) (2) (*ii*) and (*iii*)

(3) (*i*), (*ii*) and (*iii*) (4) (*i*), (*ii*)

87. Which of the following statements is NOT True about network operating system and distributed operating system ?

(1) A network operating system is made up of software and associated protocols that allow a set of computer network to be used together but a distributed operating system is an ordinary centralized operating system but runs on multiple independent CPUs

(2) In network operating system users are aware of multiplicity of machines but in distributed system users are not aware of multiplicity of machines

(3) Network operating system performs normally (with slowing down a bit) even if certain parts of the hardware starts malfunctioning but distributed system performs badly

(4) In network operating system, remote resources are accessed by logging in to desired system but in distributed system user access remote resource as they access local resources

88. Consider a distributed system with four systems namely A, B, C and D. Name the transparency required in the following situation

"Data available at all four systems and user wants to modify the data at system D"

(1) Access Transparency (2) Location Transparency

(3) Replication Transparency (4) Concurrent Transparency

89. In computer networks, IPSec is implemented to enhance the security of the network. This IPSec is designed to provide security at which OSI layer ?

(1) Network layer (2) Transport layer

(3) Session layer (4) Application layer

90. In the SSH protocol stack, which of the following is the lowest level ?

(1) SSH Transport Layer Protocol (2) IP

(3) TCP (4) SSH User Authentication Protocol

91. Server uses different ports for different communication protocols. Out of the following which port is used by server for Simple Message Transfer Protocol (SMTP) :

(1) port 35 (2) port 63

(3) port 25 (4) port 65

92. Which of the following represents a process that takes a plain text and transforms into a short code :

(1) Public Key Infrastructure (2) Symmetric Key Infrastructure

(3) Hashing (4) Private Key Infrastructure

93. One of the major responsibilities of a certification authority (CA) for digital signature is to authenticate which one of the following ?

(1) The Hash function used for signing

(2) Private keys of subscribers

(3) Public keys of subscribers

(4) Key used in DES

94. The following cipher text is received by a receiver. The plaintext was permuted using permutation (34152) and substitution. Substitute character by character +3 (A → D, etc). If the Cipher text is PDLJDLXHVQC, which one of the following = is the plaintext after decryption ?

(1) MAIGAIUESNZ (2) IAMAGENIUSZ

(3) LDPDJHPLXVZ (4) IAMAGENIUSC

95. A digital signature is required

(*i*) to tie an electronic message to the sender's identity

(*ii*) for non-repudiation of communication by a sender

(*iii*) to prove that a message was sent by the sender

(*iv*) in all e-mail transactions

(1) (*i*) and (*ii*) (2) (*i*), (*ii*), (*iii*)

(3) (*i*), (*ii*), (*iii*), (*iv*) (4) (*ii*), (*iii*), (*iv*)

96. Which of the following statement(s) is TRUE ?

(*i*) A hash function takes a message of arbitrary length and generates a fixed length code.

(*ii*) A hash function takes a message of fixed length and generates a code of variable length.

(*iii*) A hash function may give the same hash value for distinct messages.

(1) (*i*) only (2) (*ii*) and (*iii*) only

(3) (*i*) and (*iii*) only (4) (*ii*) only

97. What will be the output of the following Java code :

```
class simple
{
public static void main(String[ ] args)
{
simple obj = new simple( );
obj.start();
}
void start()
{
long [] P= {3, 4, 5};
long [] Q= method (P);
System.out.print (P[0] + P[1] + P[2]+":");
System.out.print (Q[0] + Q[1] + Q[2]);
}
long [] method (long [] R)
{
R [1]=7;
return R;
}
}
```

(1) 12 : 15 (2) 15 : 12

(3) 12 : 12 (4) 15 : 15

98. Refer to the Python code snippet below. What will be the output ?

```
x = ['ab', 'cd']
for i in x:
        i.upper()
print(x)
```

(1) ['AB','CD'] (2) ['ab', 'cd']

(3) ['Ab', 'Cd'] (4) ['AB', 'cd']

99. Consider the following function :

```
double power(double base, unsigned int exponent)
{
if (exponent == 0)
return 1.0;
else
if (even(exponent))
return power(base*base, exponent/2);
else
return power(base*base, exponent/2)*base;
}
```

How many multiplications are executed as a result of the call power(5.0, 12)? (Do not include divisions in this total.)

(1) 5 (2) 8

(3) 9 (4) 12

100. An invariant for the loop below is "$z*x^k = b^n$ and $k \geq 0$".

```
x : = b; k := n; z := 1;
while (k ≠ 0)
{
        if odd(k) then z := z*x;
        x := x*x;
        k := k/2;
 }
```

When the loop terminates, which of the following must be true ?

(1) $x = b^n$ (2) $z = b^n$

(3) $b = x^n$ (4) $b = z^n$

Space for Rough Work

Space for Rough Work